Remarks

Claims 1-10 are pending. By this Amendment, claims 1-10 are amended and new claims 16-25 are added. Upon entry of this Amendment, 20 claims will be pending. In particular, the following claims will be pending: 1-10 and 16-25. Enclosed is a check in the amount of $90 to cover the addition of five total claims in excess of 20. Please charge any additional fees due in the present application at any time to Deposit Account No. 06-1910.

Applicants' representatives would like to thank Examiner Piziali for extending them the courtesy of an interview on February 25, 2003 to discuss this case.

In the Office Action mailed October 31, 2002, the Examiner objected to the drawings as failing to comply with 37 CFR 1.84(p)(5); noted that an abstract of the disclosure is required under 37 CFR 1.72(b); objected to claims 2-6 and 8-10 under 37 CFR 1.75(c) as being improper for not referring to a preceding claim; objected to claim 4 because of certain informalities (paragraph 5 of the Office Action); rejected claim 1 under 35 U.S.C. 102(e) as being anticipated by USPN 6,165,598 to Nelson; rejected claims 2-4 under 35 U.S.C. 103(a) as being unpatentable over Nelson as applied to claim 1, and further in view of USPN 5,698,262 to Soubeyrand et al.; and rejected claims 5-10 under 35 U.S.C. 103(a) as being unpatentable over Nelson in view of Soubeyrand as applied to claims 2-4, and further in view of Applicants' Disclosure of Prior Art.

In response to the Examiner's objection to the drawings, Applicants are providing the enclosed Figure 1, in which the reference character 12 is included. This reference character 12 refers to the exterior face of the substrate and was not shown in pending Figure 1. Applicants thank Examiner Piziali for his attention to this omission.

The Examiner noted that the present application does not include an abstract of the disclosure as required by 37 CFR 1.72(b). Accordingly, Applicants have enclosed an abstract on a separate sheet of paper. Applicants appreciate Examiner Piziali's attention to this omission.

The Examiner objected to claims 2-6 and 8-10 under 37 CFR 1.75(c) as being improper for not referring to a preceding claim. Claims 2-6 and 8-10 have each been amended to refer to a preceding claim. Applicants thank Examiner Piziali for noting these omissions.

The Examiner also objected to claim 4 as being improper due to the word "is" being included inadvertently in this claim. This appears to have been a typographical error, and therefore this Amendment deletes the word "is" from claim 4. Applicants thank Examiner Piziali for his attention to this error.

The Examiner rejected claim 1 under 35 U.S.C. 102(e) as being anticipated by Nelson; rejected claims 2-4 under 35 U.S.C. 103(a) as being unpatentable over Nelson, and further in view of Soubeyrand et al.; and rejected claims 5-10 under 35 U.S.C. 103(a) as being unpatentable over Nelson in view of Soubeyrand, and further in view of Applicants' Disclosure of Prior Art. In response, Applicants respectfully traverse these rejections and request reconsideration in view of the following remarks.

Nelson teaches a pyrolytic anti-reflective coating (column 1, lines 7-8). For example, Nelson teaches an anti-reflective coating comprising a pyrolytically-applied, fluorine-doped tin oxide film and a pyrolytically-applied silica film formed over the fluorine-doped tin oxide film. Nelson indicates that both of these films are applied by conventional pyrolytic deposition methods (column 5, lines 24-27). Pyrolytically-applied films characteristically are quite rough. While rough, pyrolytically-applied silica films may be advantageous for anti-reflective coatings,

the present inventors have discovered that pyrolytically-applied silica films are less than ideal for certain applications.

For example, pyrolytically-applied films can be difficult to keep clean. This is described in the background of Applicants' specification (page 6, lines 4-6) and is evidenced in the qualitative experiment at the end of the specification (page 28, line 1 through page 29, line 16). For example, dirt, wax, oil, and other contaminants can be difficult to remove from a pyrolytically-applied film due to its high surface roughness. With hydrophilic layers in particular, these contaminants (especially hydrocarbons like oil and grease, which do not evaporate) can cause the film surface to become increasingly hydrophobic. This causes water on the surface to bead, rather than forming into a sheet, as is intended. These problems are particularly severe for automobile windscreen applications, as car wax and other contaminants are abundant in such applications. Rough, pyrolytically-applied films tend also to be less than ideal for applications where abrasion resistance is important, as rough coatings tend to be particularly vulnerable to being physically abraded.

There is no recognition anywhere in the Nelson reference of the problems associated with pyrolytically-applied films. Thus, Nelson clearly fails to appreciate the benefits of providing a sputtered silica overcoat. Sputtered films provide a relatively smooth surface as compared to pyrolytically-applied films. Sputtered films grow on an essentially atom-by-atom basis, whereas pyrolytically-applied films grow as droplets of source material from the gas and/or liquid phases. Thus, the surface roughness of a thin film is highly dependent upon its deposition process, and sputtered films in particular are characteristically smoother than pyrolytically-applied films. The present inventors have discovered that the relatively low surface roughness of sputtered silica makes it a particularly desirable hydrophilic film, particularly when used for automobile

windscreens or other applications where contaminants abound and high abrasion resistance is required.

The inventors have discovered that a synergy is achieved when a sputtered hydrophilic overcoat is provided in combination with a pyrolytically-applied low-emissivity film. As described in Applicants' specification (page 5, lines 6-21), pyrolytically-applied dielectric coatings are harder and better able to withstand exposure to the elements than sputtered coatings of the same composition and thickness. However, when a pyrolytically-applied dielectric layer defines the outer surface of a coating, the coating suffers from various problems associated with its surface roughness, as has been described. The inventors have discovered that when a pyrolytically-applied dielectric layer is provided with a sputtered silica overcoat, the resulting coating is hard enough and durable enough to be used as an exterior low-emissivity coating, while also being hydrophilic, easy to clean, easy to keep clean, and highly abrasion resistant. Thus, by providing a pyrolytically-applied dielectric coating with a sputtered silica overcoat, the resulting low-emissivity, water-sheeting coating is far more advantageous than either a coating wherein both layers are sputtered or a coating wherein both layers are pyrolytically applied.

In view of the foregoing remarks, Applicants submit that the claimed low-emissivity, water-sheeting coating comprising a sputtered silica film over a pyrolytically-applied dielectric film is neither anticipated by, nor obvious over, the teachings of Nelson. Further, the rest of applied prior art adds nothing that would render obvious the claimed coating. Therefore, Applicants submit the present application is in condition for allowance, and favorable consideration and prompt allowance are respectfully requested. The Examiner is invited to telephone the undersigned to discuss the present application.

Respectfully submitted,

Dated: 31 March 2003

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Please grant any extension of time necessary for entry and charge any fee due to Deposit Account No. 06-1910.

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